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KEYWORDS: Benign, cholestatic jaundice, malignant, MRCP and USG.

EVALUATION OF CASES OF SURGICAL JAUNDICE CORRELATING IMAGING INVESTIGATIONS AND OPERATIVE FINDINGS

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ABSTRACT

BACKGROUND: 'Jaundice' is a French word 'Juanes' which means yellow and denotes the presence of excess bile pigments in tissue and serum (Mc Fadden & Zinmer 1994). Diode was the first person to record that Jaundice can occur from bile duct obstruction (Young, 1973). **AIMS AND OBJECTIVE:** 1. To assess the clinical & biochemical picture with patients of Surgical Jaundice. 2. To study the results of different imaging investigations with clinical & operative findings & to predict diagnostic accuracy. METHODS AND **MATERIALS:** The present study was conducted in the surgical wards of Department of General Surgery, Narayan Medical College & Hospital, Sasaram, Bihar. Patients with obstructive jaundice who attended the surgical out-patients department or referred from other departments are included in this study. The time period of the study was from October 2017 to September 2018. The total numbers of patients were 56. The subject selection was random and only Adult cases were selected for the study. No special considerations of sex of the subjects were considered. Most of the necessary investigations special / baseline were done in collaboration with various other departments of Narayan Medical College & Hospital. **RESULT:** The Male: Female Ratio is 1.5:1. The pre-operative clinical laboratory, investigation was correlated with per operative and post- operative findings for benign disease. Most of the patients were in mean age of 21- 30 whereas for malignant disease patients were in mean age of 51- 60 (46.66%).The progression of jaundice throws important data on the etiology of Jaundice. There were 3 patients of Jaundice Progression of the disease as we have noted in this study. Malignant causes presented early, mostly within first 2-4 weeks of onset of Jaundice (46.6%) and some presented within first 2 weeks of rapidly progress (36.6%). The Benign causes of obstruction presented are a bit late, with maximum number presenting at 4- 8 weeks (69.2%) Only 1 case presented within first 2 weeks (3.8%). **CONCLUSION:** The diagnosis of obstructive Jaundice depends upon taking detailed clinical history and examination performing baseline investigations to confirm cholestatic jaundice and when necessary to detect cause and level of Jaundice.

INTRODUCTION:

Jaundice is a generic term for the yellow pigmentation of skin, mucous membrane and sclera that is caused by a heterogeneous group of disorders. During the last decade, our evolving ability has been to image the biliary tract and to establish the diagnosis for jaundice. Despite so many investigations still the mortality of patients undergoing surgical Treatment range 7-27% [1]. Obstructive jaundice is one of the most frequent and grave form of hepatobiliary disease. It can pose problems in diagnosis and management, particularly intrahepatic cholestasis. So, it is mandatory to determine pre-operatively the existence, the nature and site of obstruction because an ill chosen therapeutic approach can be dangerous. Ultrasound is used as an initial modality to confirm or exclude duct obstruction, which it does with at least 90% accuracy [2]. However, USG is operator dependent and has a limitation in patients with obesity and those with large amount of bowel gas. Computed tomography (CT) is a reliable modality and provides good definition of lesions and facilitates visualization of the entire extent of pancreatic pathology [3]. The range of application of CT has been partially restricted by MRCP. This techniques have greatly evolved, providing high resolution images of the biliary tree with short exam duration, while remaining non-invasive without contrast medium injection [1].

MR Cholangiography was introduced by Wallner et al in 1991. Authors used the rapid sequence gradient echo acquisition with three- dimensional post processing technique to evaluate the biliary system in five healthy volunteers and 13 patients of obstructive jaundice. The results were compared with other imaging modalities (US, CT scan and conventional radiographs obtained during PTC or ERCP) and concluded that MR Cholangio pancreatography has the capability for noninvasive imaging of the biliary tree in patients with obstructive jaundice but improvement in technique is needed to overcome limited spatial resolution and low signal to noise ratio [4]. Hence, aim of the present study was to compare the diagnostic accuracy between Magnetic Resonance Cholangio-pancreatography (MRCP) and Ultrasonography (USG) in detection and characterization in patients suspected with pancreatic and biliary system pathologies

AIMS AND OBJECTIVE:

1. To assess the clinical & biochemical picture with which patients of Surgical Jaundice present. 2. To study the results of different imaging investigations with clinical & operative findings & to predict diagnostic accuracy. This study is to correlate the clinical biochemistry with the imaging modalities & to compare actual results following laparotomy.

MATERIAL AND METHODS:

The present study was conducted in the surgical wards of Department of General Surgery, Narayan Medical College & Hospital, Sasaram, Bihar. Patients with obstructive jaundice who attended the Surgical out patients department or referred from other departments. The time period of the study was from October 2017 to September 2018. The total numbers of patients were 56. The subject selection was random and only Adult cases were selected for the study. No special considerations of sex of the subjects were considered. Most of the necessary investigations (special / baseline)

were done within facilities available presently (in the study period) in collaboration with various departments of Narayan Medical College & Hospital.

Other causes of Jaundice were excluded and only those which can be corrected by surgical intervention were included. The study undertaken was mostly prospective with some cases being both Retrospective & Prospective. All the results were later statistically quantified. All the patients studied according to a set preformat which included history, clinical examination, investigation which was later correlated with operative findings. A specimen preformat is included. After the clinical Diagnosis has been made, the following investigations were done serially.

1) Investigations to Confirm / Evaluate Clinical Diagnosis & to confirm that patient has obstructive Jaundice.
3) Investigations to confirm the site and nature of obstruction producing Jaundice.
4) Investigations to prepare patient for cooperation and to see Anaesthetic fitness.

Couinaud classification.
The Couinaud classification of liver anatomy divides the liver into eight functionally independent segments. Each segment has its own vascular inflow, outflow and biliary drainage. In the Centre of each segment there is a branch of the portal vein, hepatic artery and bile duct.

IMAGING INVESTIGATIONS TO CONFIRM EVALUATE OBSTRUCTIVE JAUNDICE.

a) Ultrasonography of whole Abdomen with Emphasis on Hepatobiliary system
This was done in all cases as a baseline investigation and to see the Dilatation of intra hepatic biliary radicals and Dilatation of extra hepatic Biliary Radicals and to detect and localize the site and nature of pathology.

b) Contrast Enhanced Computed Tomographic Scan. [CECT]
CECT was done in selected cases only where U.S.G. could not adequately verify Actual site & nature of Pathology.

c)Endo Scopic Retrograde Cholangio Panreactogram.
(ERCP) : ERCP was done in cases in which the U.S.G and/or CT scan was unsatisfactory particularly where Clinically malignant disease of Ampulla of Vater / Pancreatic head / Distal CBD was thought with Biopsies taken during such procedures.

d) MRCP Magnetic Resonance Cholangio Panreactogram selectively done in cases where USG / CT failed to evaluate / unsatisfactory particularly when a malignant case of biliary obstruction was thought of and also in proximal obstruction where interpretation of results of ERCP (in absence of PTC) was difficult.

e)PTC could only be done in very few cases due to invasiveness of the procedure and inherent hazards of the procedures. Simultaneous percutaneous biliary drainage was established thereafter to relieve biliary obstruction. Beside these diagnostic investigations following tests were done in post-operative period.
Isotope Scan using ^{99m} TC HIDA scan in 2 cases of Bilioenteric anastomosis.

Case (1) After a palliative bypass procedure in a Roux-en-jejunum Loop anastomosis with segment III duct in a case of benign stricture to see the patency of anastomosis.

Case (2) the other case where isotope Scan was done was a case of primary Sclerosing Cholangitis with proximal Ductal dilation in whom a Duct III Bilioenteric anastomosis had to be performed.

T-tube Cholangiography
T-tube cholangiography in almost all the cases of choledocotomy (for CBD stones) T-tubes cholangiogram was done on 10th post op. day.

Assessment of liver function in obstructive jaundiced patients
The preoperative assessment of liver function and prediction of post Op. remaining Functional status of liver is vital to any Biliary Surgery. Liver Tests Can be arbitrarily divided as:

I) Search Tests : 'Is Liver disease Present'?
ii) Diagnosis Tests : Etiology?
iii) Quantitative : Measure Functional Reserve of Liver.

i) Search tests

Test	Parameter measured
Bilirubin	Uptake/ Conjugation / Excretion
Bile Acids	Excretion, shunting
Alk. phosphatase	Cholestasis
Gamma Glutamyl Transpeptide	Cholestasis
5 Nucleotidase	Cholestasis
Coagulation factors	Synthesis
Transaminases	Necrosis

ii) Diagnostic Tests

Test	Disease
HBS Ag, anti HBS	Hepatitis B
Anti HCV	Hepatitis C
Anti Micro chondrial antb.	Primary Biliary Cirrhosis
ANA, ASM.	Primary Sclerosing Cholangitis

iii) Quantitative

Test	Function
Aminopyrine breath test	Microsomal function
Antipyrine Clearance	Microsomal function
Galactose elimination capacity (GEC)	Cytosolic function
Urea levels	Synthetic function
Albumin	Synthetic function

Profile of patients in our study
Jaundice due to benign causes

	Male	Female
CBD stones	4	11
CBD stricture	0	0
- post lap chole	0	2
- post open chole	1	0
- post CBD expl.	0	1
Chr. pancreatitis	1	1
Hydatid	1	1
Mirizzi	0	1
PSC	1	0
Total	9	17

All the cases of CBD stone was secondary stones.
Jaundice due to Malignant causes

	Male	Female
Carcinoma G.B	4	8
1/3 upper Cholangio CA		
1/3 upper exam	3	1
1/3 lower exam	2	1
CA head of pancreas	7	1
Periampulary neoplasm	2	1
Total	10	12

RESULT:

The pre-operative clinical laboratory, investigation were correlated with per Operative and post- operative findings.

Table -1 Clinical profile of patients of this study

Age	Benign	Malignant J	Total
0-10yr	0	0	0
11-20	2	0	2 (3.5%)
21-30	8	0	8 (14.8%)
31-40	7	3	10 (17.8%)
41-50	5	5	10 (17.85%)
51-60	3	14	17(30.35%)
61-70	1	6	7(12.5%
71-80	0	2	2 (3.5%)
	26	30	56

Thus, for benign disease most of the patients were in mean age of 21- 30 whereas for malignant disease patients were in mean age of 51- 60 (46.66%). The youngest patient was an 18 years female presenting with CBD stone whereas the oldest patient was male patient of carcinoma head of pancreas aged 78 years.

Table – 2 Sex, Prevalence

Benign cause	Male	Female	Total
CBD stone	4	11	15
CBD stricture	1	3	4
Primary Sclerosing cholangitis	1	0	1
Chronic pancreatitis	1	1	2
Mirizzi	1	0	1
Hydatid	1	1	2
Choledocal cyst	0	1	1
Total	9 (43.61%)	17 (65.38%)	26

Male: Female ratio (1:5) for Benign dis.

Table – 3

Malignant cause	Male	Female	Total
CA. G.B	4	8	12
Cholangio CA	5	2	7
CA hd of pancr	7	1	8
Periamp. Tumor	2	1	3
	18(60%)	12(40%)	30

Male: Female Ratio is [1:5:1]

The clinical examination of patients of Jaundice was based on detailed analysis of Symptoms and sizes of patients, accounting for prevalence of symptoms signs with study on prevalence of uncommon symptoms (as pain radiating to back). For, benign causes of Jaundice, as discussed earlier, CBD stones, are the commonest.

The Signs and symptoms in benign cause of jaundice are:-

Table - 4

Benign cause of Jaundice.

Signs and symptoms	No of patients	%
Jaundice	26	100%
Pruritus	18	69.2%
Pain	21	80.76%
Deep Tenderness in Rt hypochr.	17	65.38%
Lump Abdomen	1	3.8%
Hepatomegaly	3	11.5%

Table – 5

Etiology	Clinical Diagnosis of causes / level of Obst Done	Clinical Diagnosis of cases Not evident	Operation Findings
CBD stone	12	3	15
CBD stricture	4	0	4
Hydatid	2	0	2
Mirizzi	0	1	1
Choledocal cyst	0	1	1
Primary scl. Cholang	0	1	1
Chr. Panca.	2	0	2
Total	20	6	26

The incidence of Cholangitis in Jaundice due to benign cases.

CBD stone – 33% of all cases (5 of CBD Stones out of 15 cases).

In cases CBD Benign stricture – 2 cases out of 4 presented with cholangitis (50%).

1 case of Choledocal cyst presented with cholangitis.

1 case of Primary Sclerosing cholangitis presented with cholangitis.

Thus, the cumulative incidence of Cholangitis (Charcot's triad: Pain Biliary colic, fever, Jaundice) was around 38.4% of all cases of Benign Jaundice.

For Malignant causes of Jaundice, Carcinoma Gallbladder is the commonest etiology.

DISCUSSION:

The combination of Clinical Assessment and Radiologic examination provides an accurate diagnosis preoperatively in almost 98% of patients.[5]. The analysis of the Data from this study aimed a " Evaluation of causes of Surgical Jaundice correlating imaging investigations and operative findings." shows that Clinical detection rates when used alone detect 73.2% regarding Etiology & level of Obstruction (Benign : 76.29% , Malignant 70%). This data is comparable and in accordance to international study articles / reviews quoting a clinical diagnostic rate from (73-78%) [6]. The elucidation of the rise (and Post-operative fall) of levels of serum Bilirubin correlate very well with disease progression in jaundice. This generally applies to benign causes of Jaundice [7]. The present series reported an incidence of 6-10 mg% [42%] of serum bilirubin in benign disease & 11-35 mg% [36%] for malignant causes of biliary. These results are comparable to international analysis [8]. The role of cholangiography has been well defined in this study for Benign diseases ERCP and MRCP both has an sensitivity (meaning 100%) from both ERCP & MRCP. [9] Where they stated to find a sensitivity rate of ERCP to be about 100% and 100% in CBD stones. For malignant cause of Obstruction of 58.25% whereas MRCP has a diagnosis rate of 95%.The ERCP data have been Lower in Comparison but ERCP value worldwide are variable (Netculins 85-90% accurate Tpalmy, ERCP role in Diagnosis Biliary obstruction [10].

CONCLUSION:

The role of USG alone 52.18%. The role of USG + clinical parameters 57.18%. The role of CT scan was deemed inevitable in cases of malignancy causing obstructive jaundice. Thus CT scan had a positive predictive value of 80% in our studies to detect jaundice due to malignant causes. The inclusion of cholangiography showed a >95% sensitivity of MRCP in diagnostic modules. The post-operative patients were followed meticulously and confirmation of results done. Thus to conclude a definite planned management protocol with attention to correct choice of investigations should be adopted in planning treatment of a patient of obstructive jaundice. The average bilirubin of this study period for benign disease is 9.6 mg% with most of all taking in range of 6-10 mg%, whereas for malignant disease the Bilirubin levels are on an average 14.8 mg% with range 11-15 mg%. This data is consistent with international studies of Dixon & Armstrong [11], who reported a level of 8.5-11.5 mg% in benign disease and 14.5-18.2 mg% in malignant disease. The initial investigation of pt. with Obstructive Jaundice is a U.S.G. of whole Abdomen (Hepatobiliary system). The assessment of USG of cause & Level of Obstruction was done in all cases.

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